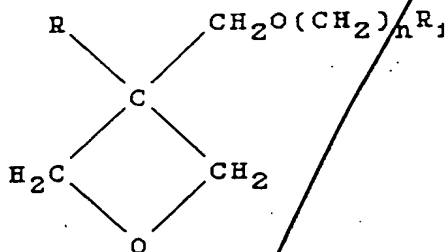


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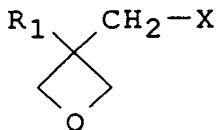
What is claimed is:

1. A method of making a mono-substituted fluorinated oxetane (FOX) monomer having the structure:



where n is 1 to 3, R is methyl or ethyl, and R₁ is linear or branched chain fluorinated alkyl and isoalkyl having from 1 to 20 carbons or oxa-perfluorinated polyether, having from 4 to about 60 carbons comprising the steps of:

- a) providing a mono-substituted oxetane premonomer having the structure:



where R₁ is selected from the group consisting of methyl and ethyl and X is a leaving group selected from the group consisting of bromo, chloro, iodo and aryl sulfonate, said premonomer being dissolved in a solvent to provide a premonomer solution;

- b) charging a reaction vessel with an aqueous solution of said mono-substituted oxetane premonomer, a fluoroalcohol, a

phase transfer catalyst and a strong base; and

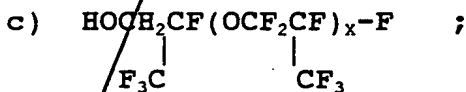
c) heating said solution to a temperature of 80-85°C until reaction is complete to form the FOX monomer as a separate organic layer.

2. A method of making a mono-substituted FOX monomer as in claim 1 which includes the steps of:

a) cooling the reaction mixture; and
b) separating the mono-substituted FOX monomer as an organic layer from the aqueous reaction mixture.

3. A method of making a mono-substituted fluorinated oxetane monomer as in claim 1 wherein:

a) said fluorinated alcohol is selected from the group consisting essentially of trifluoroethanol, heptafluorobutanol, pentadecafluorooctanol, tridecafluorooctanol, other fluorinated alcohols having the following formulas:



wherein n is 1 to 3 and x is 1 to 20 and mixtures thereof.

4. A method of making a mono-substituted FOX monomer as in claim 3 wherein:

a) said phase transfer catalyst is selected from the group consisting essentially of tetrabutylammonium bromide, tetraethylammonium bromide, trimethylbutylammonium bromide, tetratmethylummonium iodide, cetyltributylammonium bromide, crown ethers, glycols and mixtures thereof.

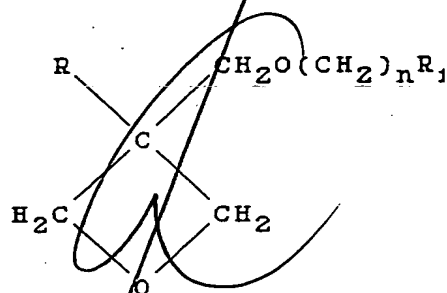
5. A method of making a mono-substituted FOX monomer as in claim 4 wherein:

a) said strong base is selected from the group consisting essentially of sodium hydroxide, potassium hydroxide, calcium hydroxide, magnesium hydroxide, tetrabutylammonium hydroxide and mixtures thereof.

6. A method of making a mono-substituted FOX as in claim 5 wherein:

a) said strong base is potassium hydroxide and said phase transfer catalyst is tetrabutylammonium bromide, and said temperature is in the range of from about 80°C to about 85°C.

7. A mono-substituted fluorinated oxetane monomer having the structure:



Where:

n is 1 to 3;

R is methyl or ethyl; and

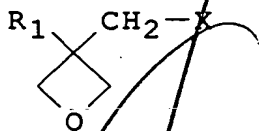
R_f is linear or branched chain fluorinated alkyl and isoalkyl having from 1 to 20 carbons or oxaperfluorinated polyether, having from 4 to about 60 carbons.

8. A mono-substituted fluorinated oxetane monomer as in claim 7 including 3-(2,2,2-trifluoroethoxymethyl)-3-methyloxetane; 3-(2,2,3,3,4,4,4-heptafluorobutoxymethyl)-3-methyloxetane; 3-(2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctyloxymethyl)-3-methyloxetane; 3-(3,3,4,4,

5, 5, 6, 6, 7, 7, 8, 8, 8-tridecafluorooctyloxymethyl)-3-methyloxetane; 3-(3, 3, 4, 4, 5, 5, 6, 6, 7, 7, 8, 8, 9, 9, 10, 10, 10-heptafluorodecyloxymethyl)-3-methyloxetane; 3-(3, 3, 4, 4, 5, 5, 6, 6, 7, 7, 8, 8, 9, 9, 10, 10, 11, 11, 12, 12, 12-heneicosafuorododecyloxymethyl)-3-methyloxetane; and mixtures thereof.

9. A mono-substituted fluorinated oxetane (FOX) monomer produced by the process comprising the steps of:

a) providing a mono-substituted oxetane premonomer having the structure:



where R_1 is selected from the group consisting of methyl and ethyl and X is a leaving group selected from the group consisting of bromo, chloro, iodo and aryl sulfonate, said premonomer being diluted in a solvent to provide a premonomer solution;

b) suspending a dispersion of a strong base in an aprotic solvent to provide a strong base suspension;

c) adding a fluorinated alcohol to said strong base suspension to produce a fluorinated alkoxide solution; and

d) adding said premonomer solution to said fluorinated alkoxide while heating the reaction mixture to a temperature of about 50 to about 125°C to permit a displacement reaction whereby said fluorinated alkoxide displaces said leaving group to produce the mono-substituted fluorinated oxetane monomer.

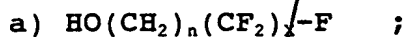
10. A mono-substituted FOX monomer produced by the process as in claim 9 which includes the steps of:

a) quenching the displacement reaction upon consumption of the starting materials; and

5 b) separating the mono-substituted fluorinated oxetane monomer product from the reaction mixture.

11. A mono-substituted FOX monomer produced by the process as in claim 9 wherein:

5 a) said fluorinated alcohol is selected from the group consisting essentially of trifluoroethanol, heptafluorobutanol, pentadecafluorooctanol, tridecafluorooctanol, other fluorinated alcohols having the following formulas:



15 wherein n is 1 to 3 and x is 1 to 20 and mixtures thereof.

12. A mono-substituted FOX monomer produced by the process as in claim 11 wherein:

5 a) said strong base is selected from the group consisting essentially of sodium hydride, potassium hydride, potassium t-butoxide, calcium hydride, sodium hydroxide, potassium hydroxide, NaNH_2 , n-butyl lithium and lithium diisopropylamide.

13. A mono-substituted FOX monomer produced by the process as in claim 12 wherein:

5 a) said solvent is selected from the group consisting essentially of dimethylformamide (DMF), dimethylacetamide, DMSO, hexamethylene phosphoramide (HMPA) and mixtures thereof.

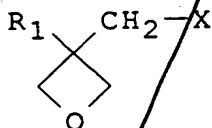
14. A mono-substituted FOX monomer produced by the process as in claim 13 wherein:

a) said temperature is from about 75 to about 85°C.

15. A mono-substituted fluorinated monomer produced by the

process comprising the steps of:

a) providing a mono-substituted oxetane premonomer having the structure:



where R₁ is selected from the group consisting of methyl and ethyl and X is a leaving group selected from the group consisting of bromo, chloro, iodo and aryl sulfonate, said premonomer being dissolved in a solvent to provide a premonomer solution;

b) charging a reaction vessel with an aqueous solution of said mono-substituted oxetane premonomer, a fluoroalcohol, a phase transfer catalyst and a strong base;

c) heating said solution to a temperature of 80-85°C until reaction is complete to form the FOX monomer as a separate organic layer;

d) cooling the reaction mixture; and

e) separating the mono-substituted fluorinated oxetane monomer as an organic layer from the aqueous reaction mixture.

16. A mono-substituted fluorinated monomer produced by the process of claim 15 wherein:

a) said phase transfer catalyst is selected from the group consisting essentially of tetrabutylammonium bromide, tetraethylammonium bromide, trimethylbutylammonium bromide, tetratmethyllammonium iodide, cetyltributylammonium bromide, crown ethers, glycols and mixtures thereof.

17. A mono-substituted fluorinated monomer produced by the process of claim 16 wherein:

a) said fluorinated alcohol is selected from the group consisting essentially of trifluoroethanol, heptafluorobutanol, pentadecafluorooctanol, tridecafluorooctanol, other fluorinated

alcohols having the following formulas:

- a) $\text{HO}(\text{CH}_2)_n(\text{CF}_2)_x\text{-F}$;
b) $\text{HOCH}_2\text{CF}_2(\text{OCF}_2\text{CF}_2)_x\text{-F}$;
c) $\text{HOCH}_2\text{CF}(\text{OCF}_2\text{CF})_x\text{-F}$;

wherein n is 1 to about 3 and x is 1 to about 20 and mixtures thereof.

18. A mono-substituted fluorinated monomer produced by the process of claim 17 wherein:

a) said strong base is selected from the group consisting essentially of sodium hydroxide and potassium hydroxide, calcium hydroxide, magnesium hydroxide, tetrabutylammonium hydroxide and mixtures thereof.

19. A mono-substituted fluorinated monomer produced by the process of claim 18 wherein:

a) said strong base is potassium hydroxide and said phase transfer catalyst is tetrabutylammonium bromide.